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ABSTRACT

The purpose of this study was to determine if a 7-hour "Project Learning Tree" (PLT) workshop had a positive effect on pre-service teachers' attitudes toward teaching environmental education. The subjects of the study were 140 pre-service teachers enrolled in an elementary science education course in Pennsylvania. Attitude was measured using the "Environmental Education Attitude Scale" developed for the purpose of this project. The findings of the study include: (1) pre-service teachers showed a significant positive change in attitude score toward environmental education after participating in the 7-hour PLT workshop; and (2) pre-service teachers showed significant positive changes in their mean attitude score on three of the four subcomponents of the scale. The cumulative score on the subcomponent scales for comfort/discomfort, need, and equipment/technology showed positive changes. The cumulative score on the time subcomponent did not show a positive change in attitude. (KR)

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The Effects of a Project Learning Tree Workshop on Pre-service Teachers' Attitudes Toward Teaching Environmental Education

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Introduction

In October 1970, Congress officially recognized a "deterioration of the Nation's ecological balance severe enough to pose a threat to the well-being of the American people." The Environmental Education Act stated that this deterioration was" in part due to a poor understanding of the Nation's environment and the need for ecological balance" (Environmental Education Act of 1970, p.1312). This information may be more critical as we move into the 1990's. Are the Nation's teachers prepared to educate the Nation's children to understand the environment and "the need for ecological balance?"

According to Buethe (1975) "teachers teach in terms of what they know and how they feel" (p. 6). This implies that if teachers have a good understanding of environmental education, teachers' attitudes toward teaching environmental education should be more positive and more able to meet the environmental needs of the 1990's. Environmental education workshops should be an effective way of developing or improving positive attitudes toward teaching environmental education.

Environmental education and science education literature highlight many studies that show the effect of long term training programs and workshops on teachers' attitudes in general. Those that deal with environmental education workshops have indicated positive effects on the attitudes of teachers toward environmental education. Jaus (1978) studied the effect of environmental instruction on teacher attitude, Stoner (1976) studied pre-service environmental education and effect on attitude, and Glass (1982) and Lawrenz (1986) looked at the effect of energy workshops on teachers' attitudes toward energy education. Minimal time for the workshops in these studies was 30 hours and maximum was a full year. All of these studies determined positive increases in attitudes after specific training was administered. It appears that regardless of length, the workshops have positive effects on teachers' attitudes.

Pre-service teachers on The Pennsylvania State University campus at University Park are required to participate in a one-day (seven-hour) Project Learning Tree (here after referred to as PLT) workshop. This seven-hour workshop may be the only direct exposure to environmental education that the pre-service teachers receive.

PLT is an environmental curriculum developed through the American Forest Foundation and the Western Regional Environmental Education Council to assist elementary and secondary teachers in integrating environmental education into the curriculum. The workshop is experience based and lasts a minimum of seven hours. Workshop members participate in many of the PLT activities and are ask to teach one of the activities to the other workshop members. Each participant receives a resource workbook, consisting of over 80 environmental education activities, upon completion of the workshop. This insures that all curriculum owners understand the philosophy of PLT and know how to use the resource

workbook. Hammerman (1960) would seem to support the philosophy of PLT, since he felt that teachers can bring more meaning and understanding to learning when they are well grounded in a variety of direct experiences.

Purpose of the Study

The primary purpose of this study was to determine if a seven-hour PLT workshop caused significant positive changes in pre-service teacher's attitudes toward teaching environmental education. Attitude was measured using the Environmental Education Attitude Scale developed for the purpose of this project. Therefore, a sub-problem of this study was to revise the Science Attitude Scale developed by Thompson and Shrigley (1986).

Instrumentation

Since no instrument was found that specifically measured attitudes toward teaching environmental education, the Environmental Education Attitude Scale was created. All of the statements were developed and analyzed according to Thompson and Shrigley's (1986) six principles set forth to test attitude scales for validity and reliability. The Environmental Education Attitude Scale was initially developed by substituting the phrase "environmental education" for "science education", so that valid statements could be salvaged from the original Science Education Scale. In the spring of 1988, a pilot test was administered to a population of 60 pre-service elementary teachers enrolled in Science Education 458. Data was analyzed using SPSSX Reliability Analysis. Homogeneous items were retained, after eliminating statements that had a mean average score of 4.5 or greater and had a .300 or less item-total correlation. The final instrument has a coefficient alpha index of reliability of .904. Since the Environmental Education Attitude Scale was a direct modification of the Science Education Attitude Scale, it stood up well to reliability and validity analysis.

The Environmental Education Attitude Scale used a five-point Likert scale response format, including "strongly disagree", "disagree", "unclear", "agree", and "strongly agree." The introduction to the instrument included environmental education definitions so that all subjects clearly understood what was meant by environmental education, concepts, techniques and issues as used in the content of the attitude statements.

Method

One hundred and forty pre-service teachers enrolled in Science Education 458, an elementary science education course at The Pennsylvania State University, University Park, Pennsylvania were involved in this experimental study. During October of 1988, all of the students in the study were involved in the treatment, a seven-hour environmental education

workshop, PLT. The pre-service teachers were randomly assigned into a control and an experimental group. Each consisted of approximately 70 pre-service teachers. The data collected from these groups were analyzed separately. Both groups took both a pretest and a posttest. The control group completed the pre- and posttests before the PLT workshop, whereas the experimental group took the pretest one week before the workshop and the posttest 2 days after the workshop. Both the control group and the experimental group had a one week period between the pretest and posttest.

Paired individual mean and group mean total scores were used in the analysis. Each attitude instrument was scored for a total summated score. Attitude statements were coded so that high scores indicated a positive attitude toward teaching environmental eduction and low scores indicated a negative attitude toward teaching environmental education. The scores were also analyzed by determining scores on the four sub-components of the scale, comfort/discomfort, need, time and equipment/technology. These subcomponents were analyzed as separate components. SPSSX t-test groups and SPSSX t-test pairs programs were used for the analysis of data. The determining level of significance was .05.

Results

Pre-service teachers showed a significant positive change in attitude toward teaching environmental education after participating in the seven-hour PLT workshop. There were no significant differences between the control group and the experimental group's scores on the pretests. The control group's pretest score of 102.8 and the experimental group's pretest score of 102.8 was analyzed by a t-test and determined no difference, significant at the .05 level. This indicates that the random sampling was valid and the week lag time between the control group's pretest and the experimental group's pretest had no effect on the responses. (See table 1.)

Table 1. A comparison of the control and experimental groups' pretest mean total scores on the Environmental Education Attitude Scale (t-test).
Note: Total Score = 140

Group	n	Mean Score	t - value	Level of Significance
Control Group	68	102.8	.04	n.s.
Experimental Group	70	102.8		

The control group showed no significant change in attitude score on the Environmental Education Attitude Scale when they took the posttest one week after the pretest. There was no PLT workshop between the time of their pretest and posttest. Since a paired t-test was used for this analysis the N slightly decreased which caused the posttest scores to slightly decrease. This decrease had no effect since there was no statistical difference between the control group's pretest score of 103.4 and posttest score of 102.7 (p is greater than .05). (See Table 2.)

Table 2. A comparison of the control group's mean total scores on the Environmental Education Attitude Scale during the pretest and the posttest (t-test). Note: Total Score = 140

Group	n	Mean Score	t - value	Level of Significance
Pretest	59	103.4	.94	n.s.
Posttest	59	102.7		

Two tests indicated a positive increase in attitude toward teaching environmental education. The experimental posttest score, of 108.7, is significantly higher than the control group's posttest score, of 102.7, (p is less than .05). The N values dropped since some of the pre-service teachers were not present to take the posttest. (See Table 3.) Also, the randomly sampled experimental group, when tested two days after the PLT workshop showed a positive significant increase (p=.05) in mean posttest attitude score. The score increased from 102.2 on the pretest to 108.7 on the posttest. Once again the N has dropped since paired subjects were used for this analysis. (See Table 4.)

Table 3. A comparison of the control and experimental groups' posttest mean total scores on the Environmental Education Attitude Scale (t-test). Note: Total Score = 140

Group	n	Mean Score	t - value	Level of Significance
Control Group	59	102.7	3.08*	.003
Experimental Group	53	108.7		

*significant

Table 4. A comparison of the experimental group's mean total scores on the Environmental Education Attitude Scale during the pretest and the posttest (t-test). Note: Total Score = 140

Group	n	Mean Score	t - value	Level of Significance
Pretest	53	102.2	5.9*	.001
Posttest	53	108.7		

*significant

Based upon the findings and within the limitations of this study, it is concluded that participation in a PLT workshop results in a positive attitude change toward teaching environmental education. Four sub-components of the scale were also analyzed for differences. The workshop caused a positive increase in pre-service teachers' scores on three of the four sub-components of the scale. Positive changes in attitude scores reflect changes of pre-service teachers' perception of the need to teach environmental education, their level of comfort with the subject matter and the use of equipment and technology. However, pre-service teachers did not show a significant positive increase in score when analyzing the time sub-component.

Discussion

A seven-hour workshop that indicates a positive effect on attitude may not be that surprising, especially when measured only two days after the workshop. There is social-psychological research highlighted to support the fact that attitude can change within short periods of treatment time. Koballa and Shrigley (1983) have identified that 13-minute persuasive messages on energy conservation can have a significant long lasting affect on attitude. Houndshell and Liggett (1976) stated that "Knowledge is apt to increase only with continued emphasis; whereas attitudes are more likely to become ingrained as a part of the total atmosphere" (1976, p. 35).

This research helps support the fact that PLT can assist in increasing attitudes toward teaching environmental education, even attitudes that may already seem high. However, as noted in this research the time subcomponent did not indicate a positive change in attitude. This may indicate that pre-service teachers may feel that there is not enough time in the curriculum to include environmental education.

The method of presentation and and the philosophy of PLT may be two of the determining factors that increase the strength of attitude change. PLT's method and philosophy are both well grounded in educational theory. The results of this research support the inclusion of PLT into pre-service education programs as well as in-service programs for practicing teachers. However, time was still perceived as a detriment to including environmental education in the curriculum. In the future, it may be of interest to structure workshops so that the issue of time is addressed. Demonstrating environmental education as an infusion subject, rather than a separate entity, may address this issue. With environmental problems as key issues in the world, teachers need a positive attitude toward teaching environmental education. Hopefully, time can be erased as a threat to it's inclusion in the curriculum.

Recommendations for Further Study

The measurement of attitudes needs to be replicated. The instrument used in this study should be reused to find out the effectiveness of other environmental education curricula. Other populations, such as teachers and administrators should be tested for the effect of environmental education programs on attitude toward teaching environmental education. Science education pre-service teachers were used in this study, pre-service teachers that are not involved in a science education class should also be tested for the effects of PLT.

Follow-up tests are important in any attitude study. In this case follow-up studies should be developed to determine how much pre-service and in-service teachers actually use the new curriculum in the classroom. This type of study may become more of a study of behavior than attitudes.

As shown by this study, PLT can be successful in increasing educators' attitudes toward teaching environmental education. Further research could evaluate the PLT workshop and curriculum to find the direct cause of the attitude change. Areas that may be identified as key to the change of attitude may be the PLT curriculum, facilitators, and workbook materials.

Another area of interest may be to determine the optimum length of environmental education workshops in relation to their success in changing attitudes toward teaching environmental education. Seven hours appeared to be effective, and there are many studies that show longer workshops have positive effects on attitude. Some show shorter lengths of time to be effective as well. For further study, it would be of interest to determine if a 14-hour workshop would be twice as effective or a if a 3.5 hour workshop half as effective as a seven-hour workshop.

Bibliography

Buethe, C. (1975). The Status of Indiana Teacher's Environmental Knowledge and Attitudes. Unpublished Masters Thesis, Indiana State University, Terre Heute, Indiana.

Bureau of School Service and Research. (1977). Project Learning Tree Evaluation Summary Report. University of Washington, Seattle.

Edwards, A. L. (1957). Techniques of Attitude Scale Construction. New York: Appleton-Century-Crofts, Inc.

Environmental Education Act of 1970; United States Statutes at Large, 84, Public Law 91-516.

Fishbein, M. & Ajzen, I. (1975). Beliefs, Attitudes, Intention and Behavior: An Introduction to Theory and Research. Boston, MA: Addison-Wesley.

Glass, L. W. (1982). An in-service energy education program for elementary school teachers. Journal of Research in Science Teaching, 19 (6), 469-474.

Hounshell, P. B. & Liggett, L. (1976). Environmental education one year later. Journal of Environmental Education, 8 (1), 32-35.

Jaus, H. (1978). "The effect of environmental education instruction on teachers' attitudes toward teaching environmental education. Science Education, 62 (1), 79-84.

Koballa, T. R. & Shrigley, R.L. (1983). Credibility and persuasion: A socio-physiological approach to changing the attitudes toward energy conservation of pre-service elementary school science teachers. Journal of research in Science Teaching, 20 (7), 683-96.

Lawerenz, F. (1986) Teacher to student transfer in energy education. School Science and Mathematics, 86 (2), 1-9.

Project Learning Tree (1977), Supplementary Activity Guides, Grades Kindergarten through 6 and Grades 7-12 and Project Learning Tree Workshop Handbook. The American Forest Institute and The Western Regional Environmental Education Council, Inc. Washington, D.C.

Stoner, D. K. (1976). Integrating Environmental Education into Pre-service Teacher Preparation. Unpublished Masters Thesis, California State University.

Thompson, C.L. & Shrigley, R.L. (1986). What the research says: Revising the science attitude scale. School Science and Mathematics, 86 (4), 331-343.